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DEPARTMENTAL CIRCULAR

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No. 5

MAKING GOOD PHOTOGRAPHS.

(Contribution from Division of Publications.)

Every mail brings to the section of illustrations and the other photographic laboratories of the department a large number of films, each one of which the man who has taken it is anxious to have developed and printed immediately. As a result, the laboratories are frequently swamped with work and the prompt delivery of all photographs becomes impossible. Under such conditions every picture which is not useful to the department delays the completion of those that are useful.

CAUSES OF POOR PHOTOGRAPHS.

An unnecessarily large number of the pictures submitted for development have been improperly made. Sometimes the exposure has been under or over timed, the focus or diaphragm may have been improperly set, the light may have been impossible, or the subject unsuited to the capacity of the particular camera employed. To obviate these dangers, those who are not skilled in photography should use as simple a camera as possible. Except in expert hands, the more complicated the camera the more likely is the negative to be photographically defective. Special lenses involve problems of exact focusing and the proper setting of the diaphragm with relation to distance, light, and time, which, in the majority of cases, need not be considered with a good but simple lens so set as to operate effectively with a universal focus. Certain technical results can, of course, be obtained only by the use of special equipment, but in any event such work usually requires the services of an expert photographer.

Another common source of failure is the attempt to take a slow exposure without making certain that the camera box is absolutely steady. It is almost impossible to take a successful photograph with a longer exposure than $\frac{1}{25}$ of a second unless the camera is firmly fixed. Light folding tripods add little to the burden of luggage, but where it is absolutely impossible to carry one, an aluminum device which enables the photographer to fix the camera to the top of a chair, an empty barrel, or a fence rail, may be found useful for time exposures. This device consists of a screw clamp, an adjustable ball joint, and a screw. It weighs but a few ounces and can readily be carried in the pocket.

THE DEPARTMENTAL CIRCULAR is issued as a convenient means of intercommunication of official information among the personnel of the Department of Agriculture. Its circulation, therefore, will be limited to those having official connection with the department. Its editorial policy will be determined wholly by the specific class of readers for whom it is published and, therefore, may depart somewhat from the editorial policy governing material issued for the public. While the material to be published will by no means be confidential, the department can not extend the circulation of this publication beyond its own employees and official collaborators.

In order to assist field workers who are called upon to take photographs in the course of their work, a few simple directions which will aid those who have had comparatively little experience in the taking of pictures in obtaining more successful negatives are given below.

SIMPLE DIRECTIONS FOR PHOTOGRAPHY.

Size of camera and lens.—The best and most consistent work done by men in the field is with cameras $3\frac{1}{4}$ by $4\frac{1}{4}$ inches in size. The lens necessary to cover sharply this size of plate or film is of short enough focus to be used with a large diaphragm opening and yet secure a reasonably sharp image from foreground to distance. The difficulties of securing this depth of sharpness increase enormously with the increased size of plate or film, because of the longer focus lens required.

Conditions frequently arise where absolute sharpness is essential and where rapid exposures must be made. This result may in many cases be secured with a small camera, where a larger one used by the amateur would not give good results. Lack of sharpness is so pronounced in many negatives as to make them useless for illustrations or even as records.

The finder.—A direct view finder is the best for general all around work, but too much dependence should not be placed upon it until it has been thoroughly tested and found to register exactly with the image produced by the lens on plate or film. The angle of view of these finders varies somewhat with the distance of the eye from it, and they must be tested, and then always used at a certain fixed distance from the eye to give accurate results.

In photographing objects close up all finders are practically worthless and a ground glass focusing screen is essential. This is due to the inability of the finder and lens to occupy the same place at the same time, although at distances from 15 or 20 feet to infinity this difference amounts to so little that finders are then serviceable. An accurate finder is extremely important. Many films and plates are rendered useless because the heads and feet of animals or important parts of plants, etc., are cut off, due to the use of an inaccurate finder. A direct view finder used at the level of the eye is often instrumental in producing better depth of sharpness because in many cases it eliminates superfluous foreground.

The reflecting types of cameras should never be used except for photographing animals under certain conditions or in other specialized work. They are entirely unsuited for general field work. In the experience of the laboratory men, the work produced by them is usually worthless.

Underexposure is the most common defect of films submitted for development. As a rule the higher priced the camera, and the more rapid the lens and shutter, the greater the chances for underexposure, when they are used by the inexperienced. For some reason there is a decided tendency on the part of those using high-grade cameras to set the shutter at its maximum speed and use it there always, irrespective of light conditions, diaphragm opening, or subject. This results in a great waste of film each year and a corresponding loss in photographic records and illustrations. A safe rule to follow is never to make a "snap shot," if conditions permit of a time exposure on a tripod with a smaller diaphragm opening. This not only will produce a sharper image throughout, but will increase the latitude of exposure and result in a decided increase of good negatives.

Backgrounds.—A safe rule to follow is to use a background that will produce a decided contrast with the object photographed. In this case an error of overexposure will still leave sufficient contrast between subject and background for the laboratory man to "block out" the background and produce a satisfactory print.

In many cases, owing to incorrect exposure and unsuitable backgrounds, parts of the subject wanted have been entirely lost because the edges seemed to evaporate into the background. This condition becomes manifest when photographing plants like tobacco against a white background

(Continued on page 3.)

IMPORTANT RULINGS.

COMPTROLLER'S DECISIONS.

(Contribution from the Office of the Secretary.)

In recent correspondence with the Secretary of Agriculture the following principles have been enunciated by the Comptroller of the Treasury:

An officer of the Department of Agriculture paid from a *lump sum* and engaged in *technical* or *scientific* work may receive an increased compensation if the increase is intended as *bona fide* additional compensation for services rendered under unusual and exacting conditions, and this may be carried into effect either by a letter of authority or by a regulation; however, if the increase is intended as *commutation of expenses* incurred on account of the peculiar nature of the services it can not be paid. (Dec. dated Aug. 27, 1915.)

The traveling expenses of an officer detailed from one department for the purpose of cooperating in the work of another may be paid either from an appropriation of the first department, with a subsequent reimbursement to that appropriation by transfer settlement through the Treasury, or directly from an appropriation of the second department. The latter method is preferable, as it obviates the necessity of a transfer account, and permits an administrative examination of the account by the department which must finally bear the expense. The officer is traveling as an officer of his own department on detail, and as such his expenses are subject to the laws and regulations of that department. (Dec. dated Sept. 1, 1915.)

OPINIONS OF SOLICITOR.

FIELD MEN LIABLE FOR POLL TAX.

In an opinion dated August 14, 1915, with relation to the liability of field men to the payment of a poll tax in States where employed, the Solicitor holds as follows:

"An officer or employee of the Federal Government is exempt from the operation of State legislation in so far as it may interfere with, or impair, his efficiency in performing the functions by which he is designed to serve that Government. Otherwise he does not cease to be subject to the laws of the State under whose jurisdiction he may be by reason of becoming a Federal officer or employee.

"It is the opinion of this office that the levy against a Federal officer or employee of a poll road tax, to be paid in money, does not hinder the performance of his duty to the United States Government, and that he is not entitled to exemption from the tax by

reason of being such officer or employee. Whether, in such case, the officer or employee is liable to the tax, depends upon the interpretation and application of the particular State statute which imposes it.

"In the case at hand, it appears that for a period of more than 12 months Mr. ——— has actually lived in ———, Idaho, has received the protection of the laws of the State, and has probably used its roads. Under these circumstances it is believed that he should pay the road poll tax of \$4 assessed against him under the Idaho statute."

HIRE OR PURCHASE OF VEHICLES.

The following opinion, dated August 20, 1915, pertains to the hiring or purchase of vehicles:

"In a decision dated January 19, 1915 (21 Comp. Dec., 462), the Comptroller holds 'that the hiring of an automobile by the month or year would be in violation of section 5 of the act of July 16, 1914, and hence unauthorized,' as such a hiring would be doing indirectly what the statute prohibits being done directly. It is obvious, therefore, that section 5 reaches and prohibits the yearly or monthly hiring of such vehicles. However, there is no suggestion in any decision of the Comptroller that this section prohibits the temporary hiring of such vehicles when the same are necessary for travel in carrying on the ordinary field work of the department.

"In order to keep clearly within the letter and spirit of the law, the hiring of such vehicles should be temporary and should be confined strictly to specific necessities for travel as they arise, and the period of rental thereof should never extend beyond the exigency of the occasion. The power to hire such vehicles for the ordinary and usual travel of employees in field work, as it existed prior to the enactment of the statute, under the Comptroller's construction thereof, has not been in any way restricted. The legal effect of the rule laid down by the Comptroller is that a general or long term hiring contract can not be substituted for a purchase, and that what the statute forbids being done directly shall not be done indirectly."

MEMORANDUM No. 145.

Regarding the Examination of Manuscripts Submitted for Publication.

Mr. Edwy B. Reid, of the Office of the Secretary, has been designated to consider and critically examine all manuscripts submitted for publication by the department. He will make constructive criticisms and

suggestions for the improvement of manuscripts and will consult fully and freely with the chiefs of the various bureaus, divisions, and offices, the authors of manuscripts, and any other officer or employee of the department. He will devote his entire time to this work and will report directly to the Secretary. All officers and employees are instructed to cooperate with Mr. Reid in this work to the fullest extent and to render him all possible assistance.

Mr. Reid will have the benefit of the advice and assistance of the Committee on Examination of Manuscripts, which will be continued in an advisory capacity. In addition to the present personnel, Mr. George W. Wharton, Chief of the Office of Information, has been appointed a member of the committee.

Manuscripts should be submitted, as at present, to the Division of Publications, where they will be read, prepared for the printer, and transmitted to Mr. Reid for consideration and critical examination. The usual notice of the receipt of each manuscript will be sent by the Division of Publications to the chief of each bureau, division, or office. When a manuscript is forwarded to any bureau for examination, it must be returned to Mr. Reid *within three days*, with any recommendations or criticisms. Mr. Reid will secure the advice of the Committee on Examination of Manuscripts regarding all manuscripts submitted, and, when necessary, will confer with the chief of the bureau concerned, the author of the manuscript, or any other officer or employee of the department.

When the manuscript is in proper shape for publication, and has been approved by the Secretary, it will be returned by Mr. Reid to the Division of Publications for transmission to the Government Printing Office.

D. F. HOUSTON,
Secretary.

AUGUST 18, 1915.

MEMORANDUM No. 146.

Forms of Salutation and Conclusion for Letters Prepared for the Signature of the Secretary or Acting Secretary.

In paragraph 99 of the Administrative Regulations, as amended by Memorandum No. 143, dated July 1, 1915, the forms of salutation and conclusion are incorrect, the printer having failed to follow copy in indicating the type, indentation, and spacing. Accordingly these forms should be disregarded, and, in all letters prepared for the signature of the Secretary or Acting Secretary, the forms given in Memorandum No. 99, dated July 18, 1914, should be followed,

with type, punctuation, indentation, and spacing exactly as indicated therein.

D. F. HOUSTON, *Secretary*.

AUGUST 31, 1915.

NOTE.—Copies of Memorandum No. 99 may be obtained from the Office of the Secretary.

MEMORANDUM No. 147.

Regarding Committees on Clerical Efficiency.

In accordance with Memorandum No. 125, dated March 18, 1915, the personnel of the Committees on Clerical Efficiency of the various bureaus, independent divisions, offices, and boards is hereby changed as indicated:

Office of the Secretary.—R. M. Reese, chairman, Raymond Augusterfer, James R. Williams (vice Alex. McC. Ashley).

Office of the Solicitor.—R. W. Williams, chairman (vice W. P. Jones), E. B. Quiggle, W. C. Henderson (vice R. W. Williams).

Weather Bureau.—E. H. Bowie, chairman, A. J. Henry, Robert Seyboth, Edgar B. Calvert (vice C. C. Clark), Edward C. Easton (vice H. E. Williams).

Bureau of Animal Industry.—John R. Mohler, chairman, George Ditewig, A. M. Farrington (vice C. C. Carroll).

Bureau of Plant Industry.—James E. Jones, chairman (vice David Fairchild), R. A. Oakley, J. W. T. Duvel (vice James E. Jones).

Forest Service.—A. F. Potter, chairman, E. H. Clapp, D. D. Bronson (vice James B. Adams).

Bureau of Chemistry.—R. L. Emerson, chairman, W. W. Skinner, Stuart Postle (vice F. B. Linton).

Bureau of Entomology.—C. L. Marlatt, chairman, A. D. Hopkins, E. B. O'Leary (vice R. S. Clifton).

Bureau of Biological Survey.—E. W. Nelson, chairman, W. L. McAtee, W. F. Bancroft (vice T. S. Palmer).

Division of Publications.—Jos. A. Arnold, chairman, A. B. Boettcher, Chas. H. Greathouse (vice B. D. Stallings).

Bureau of Crop Estimates.—L. M. Estabrook, chairman, Frank Andrews, Edward Crane (vice N. C. Murray).

Bureau of Soils.—A. G. Rice, chairman, C. H. Seaton, Chas. A. Drake (vice Chas. A. Wolfe).

Library.—Miss E. B. Hawks, chairman, Miss L. K. Wilkins, Miss K. G. Upton (vice Miss H. M. Thompson).

Office of Public Roads and Rural Engineering.—Logan W. Page, chairman, J. E. Pennybacker, S. H. McCrory (vice P. St. J. Wilson).

Office of Markets and Rural Organization.—R. V. Bailey, chairman (vice W. A. Sherman), W. R. Meadows (vice R. V. Bailey), C. E. Bassett.

Insecticide and Fungicide Board.—M. B. Waite, chairman, J. A. Emery, J. L. Monarch (vice J. G. Shibley).

No change is made in the personnel of the following committees at this time:

Division of Accounts and Disbursements.—W. J. Nevius, chairman, F. W. Legge.

Federal Horticultural Board.—Geo. B. Sudworth, chairman, W. D. Hunter.

States Relations Service.—W. H. Beal, chairman, J. A. Evans, L. A. Clinton.

Office of Farm Management.—E. H. Thomson, chairman, Lisle Morrison, H. M. Dixon.

D. F. HOUSTON,
Secretary.

AUGUST 31, 1915.

MEMORANDUM No. 148.

Regarding Importation of Plant Material.

Hereafter all requests or orders for plant material from foreign sources shall be called to the attention of the Federal Horticultural Board before they are issued, and all correspondence addressed to the Government Dispatch Agents and relating to the importation of plant material into the continental United States shall be transmitted through the Federal Horticultural Board and shall be forwarded only after approval by the chairman of the board or his proper representative.

C. F. MARVIN, *Acting Secretary*.

AUGUST 28, 1915.

LOST ARTICLES.

To chiefs of bureaus, divisions, and offices:

From time to time watchmen and other representatives of the department turn in to this office articles of more or less value which have been found either in the buildings or on the premises, and in practically every such instance we have been able to find the owners. In many cases, however, employees inquire here for lost articles without avail, because they were never turned in to this office. If you will instruct the employees of your branch of the service to see that all personal articles found by them either in the buildings or on the premises are delivered to my office, we will make it a point to try to find the owner.

Respectfully,

R. M. REESE,
Chief Clerk of Department.

AUGUST 27, 1915.

MAKING GOOD PHOTOGRAPHS.

(Continued from page 1.)

under the harsh light of the sun. The upper surface of the leaves reflects the sky and are sometimes lost into the ground. There are certain impossible photographic conditions and when one is confronted by them it is an act of good judgment not to attempt to expose.

WHAT NOT TO DO.

Do not attempt to photograph anything growing under slat covers in the sunlight. The zebra-like effect is intensified in the negative. This and many other subjects demand a gray day to be photographed properly. Reds, greens, and oranges, except under extraordinary conditions, will photograph too dark. A ray screen when used with the ordinary film or plate will not materially benefit this condition. A ray

screen is useful only when used with the kind of plate for which it was made.

Don't forget a "fast" anastigmat lens requires much more knowledge to use successfully than a slower "rapid rectilinear."

Don't experiment with ray screens, telephoto lenses, back combinations, etc., unless you can foresee the result.

Don't use the camera vertically to show a broad expanse of fields. This is a common error of the field men.

Don't take photos from moving trains; they are useless for illustrations and are seldom sharp.

Don't make exposures of more than one-twenty-fifth of a second without using a tripod.

Don't expect the same quality in a "snap shot" negative, camera held in the hand, that you can get by carefully focusing and using a tripod and giving a time exposure, circumstances permitting.

Don't make duplicate exposures of important subjects and give them all the same exposure. Vary the exposures in cases like this and one might be correct.

Don't expect good results on a hazy day, no matter how good your camera.

Don't attempt making "natural size" photos in the field unless somewhat experienced.

WHAT TO PHOTOGRAPH.

There is, however, more to the taking of good serviceable pictures than proficiency in the mechanics of photography. Every negative which can be successfully developed and made to yield a clear print is not necessarily of value to the department. A truly successful photograph is one which can be used to advantage in a publication of the department, is a useful record of valuable work, or preserves for reference some practical operation or scientific fact. In the early days of photography when one could at best carry about only a few heavy wet plates prepared with considerable labor beforehand, photographers thought twice before they decided that a subject was worth one of these plates. To-day, however, the exposing of a film means for the operator merely the pointing of the camera, the turning of the film roller, and the pushing of a button. The temptation to take snapshots of everything that looks interesting is, therefore, very great. In consequence, there are many prints that are technically good, but for practical purposes are merely duplications of similar photographs which tell the same story although they may have been taken under different conditions. Duplications of this character do not advance in any practical way the work of the department but, on the contrary, hinder it by delaying the completion of the really important pictures.

The user of the camera should ask himself the following questions before he takes a proposed picture:

(1) Is the picture merely a repetition in other places and with other actors of a photograph that is already available?

(2) If it is a repetition, is there any useful purpose to be served by taking it in this particular locality?

(3) Will the photograph illustrate clearly some fact or process, or is it in reality a portrait group of a number of people who may like to have their pictures taken or may interest the operator personally? In many cases it has been found that in the effort to include too many people in the scene the operator has placed his camera at such a distance that the picture does not reveal clearly the operation which it is supposedly designed to illustrate.

(4) What will the picture teach by itself? If it is of use only when it is made a part of a series, the photographer must consider the probability of his being able to obtain at a future date the companion pictures which are essential to its value. Many negatives show only one stage in an operation and by themselves are of no significance.

(5) Does the department need this picture and exactly to what use will it be put? The answer to this question will often keep the operator's finger from the button.

PHOTOGRAPH FOR A DEFINITE PURPOSE.

A photograph made as a scientific record should, of course, be devoted to this purpose alone and no other consideration should be allowed to interfere with the clearness and accuracy of the record. Where the purpose of the photograph is primarily educational, however, and especially in the case of photographs intended to arouse popular interest, it is most desirable to have some human or animal life in the picture. This lends human interest to the story. A collection of cooking utensils by itself is much less interesting than the picture of some one cooking with them. A picture of a field with men and animals in it is more attractive than the same field deserted. This element of interest, however, must be subordinated to the importance of bringing out unmistakably the real subject of the picture. The actors must draw attention to, rather than divert the mind from, the fact or process which it is intended to illustrate.

In many cases photographs are taken for the purpose of showing the condition of growing crops. Here amateurs frequently fall into two errors. They are disposed to include so broad a scene that each individual object is reproduced on too small a scale to convey any definite idea of its condition, and they omit to provide any standard by which the eye may unconsciously measure the size of the plants. In cases where this is a really important feature of the photograph, the operator will do well to put in the foreground some familiar object—it may be a human figure or a yard measure, or a hat, or a walking stick. Anything the size of

which is unconsciously appreciated will serve the purpose. This is particularly important when near views of fruits or plants are desired. It is perfectly possible to take a picture of a blackberry that is 2 or 3 inches in diameter in the print that will convey a totally false impression of the actual size of the berry. In such cases if a coin, for example, is dropped in the foreground, the risk of involuntary deception will be automatically removed. In taking a series of photographs designed to show successive stages in the growth of a crop, each picture should be taken, if possible, from exactly the same distance and under the same mechanical conditions of focus and adjustment of lens. Where this precaution is not observed the successive pictures will not be on the same scale and the true comparative proportions of the plants will not be shown. With closely planted crops such as wheat, for example, the picture may also be greatly strengthened by cutting a small, even swath in the foreground. The fine stand which it is desired to illustrate is then shown in contrast to the smooth, closely cut stubble, and the lesson of the picture taught much more forcibly than when the foreground shows scattered or volunteer growths along the edges of the field. In taking pictures of this character it is usually desirable also to take a close view of the plants in order to show them in detail. With a small camera a picture of a large field of wheat is very apt to look like any other kind of a field, and, without the assistance of the caption, it is almost impossible at times to tell what the crop is, to say nothing of its condition.

The foregoing suggestions are intended for the use of those with little photographic experience and whose pictures are intended to convey a general impression rather than to record a scientific fact. Where the latter is the object, highly specialized apparatus and technical ability on the part of the operator are called for. Those who are not expert photographers but who contemplate work of this character will do well to consult with the photographic specialists of their bureaus or the section of illustrations and obtain advice from them upon the type of camera and lens to be used, and special methods of timing, lighting, and focusing. Photographers of the section of illustrations will be glad to give any information they can on these points, and practical suggestions and assistance to field workers as well. They will also be glad to explain, whenever these can be ascertained, the reasons for the failure of certain pictures. To enable them to do this, the operators should make a pencil record of each exposure, stating the conditions under which the picture was taken, and send this in with the film to the photographers. This record should state the time of exposure, the state of the light, the adjustment of the diaphragm, and similar information.

DEPARTMENT AND A. A. A. C. AND E. S.

(Contribution from States Relations Service.)

The object of the Association of American Agricultural Colleges and Experiment Stations is the consideration and discussion of all questions pertaining to the successful progress and administration of agricultural colleges and stations and to secure mutual cooperation.

Every college established under the act of Congress approved 1862, or receiving the benefits of the act approved August 30, 1896, and every experiment station established under State or Congressional authority, the Bureau of Education of the Department of the Interior, the Department of Agriculture, and the Office of Experiment Stations, are eligible to membership.

The association is divided into three sections: (1) College work and administration, (2) experiment station work, and (3) extension work. Meetings of the association are held annually to which each college is entitled to send three delegates. These are usually the president or dean, and the directors of the experiment station and extension division. Thus the section on college work and administration is composed of the presidents or deans of colleges and universities represented in the association; the section on experiment-station work is composed of directors or acting directors of experiment stations represented in the association, and the section on extension work is composed of directors or superintendents of extension divisions of institutions in the association. The representative from the Office of Experiment Stations belongs to the section on experiment-station work, and the representative of the department as a whole to the section he may choose.

As a rule, the Department of Agriculture is represented on the standing committees, and through the work of these committees a large amount of cooperation between the department and the association is effected. In addition there are a number of joint committees of the association and the United States Department of Agriculture. For example, there are the committee on relations, which consists of representatives of the States Relations Service of the department, and the executive committee of the association; and the committee on projects and correlations, consisting of three members each from the department and the association. The committee on publication of research is similarly organized. In the past the department has cooperated with the association in working out courses of study, in helping them to determine a policy for college administration, for carrying on their experimental work, and for making their extension teaching efficient.

Through the committee on instruction in agriculture, the department has aided the association in outlining courses of instruction, in determining the requirements for persons engaged in different types of work, and in other ways raising the standard of instruction in our agricultural institutions. The joint committee on projects and correlations is attempting to work out a method whereby there will be less duplication in the work of the department and the various experiment stations, and devise a means of correlating the experimental work of the department with that of the State institutions. Through the committee on publication of research the department and association cooperate in the publication of the *Journal of Agricultural Research*, which contains scientific articles embodying the results of investigations conducted by the Department of Agriculture and the experiment stations of the various States.

The association and the department have cooperated in the management of a summer Graduate School of Agriculture held biennially at some one of the colleges in the association. The Director of the Office of Experiment Stations (and now of the States Relations Service) has been dean of this school. Its next session will be held at the Massachusetts Agricultural College in 1916.

ENTOMOLOGY ABSTRACTS.

(Contribution from Bureau of Entomology.)

Embryology of spring grain-aphis.—

In the *Journal of Agricultural Research* for August, under the title, "Further Studies of the Embryology of *Toxoptera graminum*," Mr. W. J. Phillips supplies the gap in the continuity of the study of the development of the winter egg of the spring grain-aphis, or "green bug," as published in 1912 in Bulletin 110 of the Bureau of Entomology. The text and drawings describe and illustrate the revolution of the embryo. They show also the position of the polar organ during the initial and intermediate stages of the revolution and the final fate of this organ toward the close of the revolution in its merger with the large mass of cells which later forms the dorsal organ.

Boll-weevil studies.—Since the publication, in 1912, of the Bulletin of the Bureau of Entomology on the boll weevil (S. Doc. 305, 62d Cong., 2d sess.) several important discoveries bearing on the weevil have been made and much additional information on the various phases of its life history has been secured. In Department Bulletin 231, "Recent Studies of the Mexican Cotton Boll Weevil," Mr. B. R. Coad furnishes a résumé of these discoveries and deals with a number of rather technical observations and experiments which have important bearings on the general boll-weevil problem. The principal matters dealt with are (1) the relation be-

tween the typical boll weevil and the form which has recently been found attacking a cotton-like plant, *Thurberia thespesioides*, in Arizona, and (2) the changes in the habits of the boll weevil which have taken place since it first entered the United States. It appears that the western weevil might thrive if it should become introduced into the drier portions of Texas, where the typical weevil has not been able to establish itself, and thus reduce cotton production in a large area which has been depended upon to offset the loss caused by the boll weevil in more humid regions.

Codling moth in Maine.—To ascertain the variations in the life history of the codling moth under diverse climatic conditions, studies, essentially the same in method, have been conducted in such widely separated districts as Maine and New Mexico and in many intermediate localities throughout the United States. The results of studies in Maine are given by E. H. Siegler and F. L. Simanton in Department Bulletin 252, "Life History of the Codling Moth in Maine." The codling moth is shown to have one full generation annually in Maine, 1 or 2 per cent of the individuals of which transform to make a partial second generation. The insect may be controlled in that section with one thorough spraying of arsenate of lead (2 pounds of the paste or 1 pound of the powder to each 50 gallons of water) as soon as the petals of the apple blooms have fallen.

Gipsy-moth larvæ spread by the wind.—For many years the rapid extension of the territory in New England occupied by the gipsy moth was ascribed principally to the accidental carriage of caterpillars on railroad cars, automobiles, and other vehicles, since the female moth does not fly. This, however, does not account for the establishment of numerous colonies distant from roads and railroad right of ways. In 1910 it was discovered experimentally—in the laboratory with an electric fan, and in the field by means of screens of poultry wire erected in a number of chosen localities and coated with tree tanglefoot—that the first-stage caterpillars are carried considerable distances through the air by the wind. Further studies and experiments of a similar character, recorded in Bulletin 173, "Dispersion of Gipsy-Moth Larvæ by the Wind," by C. W. Collins, show that these aerial journeys are much longer than has been supposed, and it is now known that larvæ are carried from one-eighth of a mile to 13½ miles or more in this way.

Hearing to the confectionery trade.—A public hearing will be held in Washington, on October 9, by the Bureau of Chemistry, upon the subject of the marking under the net-weight amendment to the Food and Drugs Act of the quantity of the contents, when in package form, of that class of confectionery, known to the trade as "count" goods. The hearing will be held at 10 a. m., October 9, 1915, in room 427, Bieber Building, 1358 B Street, SW.

FUMIGATING COTTON.

(Contribution from Federal Horticultural Board.)

In order to prevent the introduction and establishment of the pink boll worm, *Gelechia gossypiella*, and other injurious insects, all cotton lint, baled or unbaled, grown in any foreign country or locality, is subject to all the provisions of sections 1, 2, 3, and 4 of the plant-quarantine act. Amendment 3 to regulation 6 of the Rules and Regulations Governing the Importation of Cotton Lint into the United States prescribes that all imported foreign cotton, after February 16, 1916, shall be disinfected at the port of entry under the supervision of an inspector of the Department of Agriculture, and this disinfection will consist in fumigating the bales with hydrocyanic-acid gas in an air-tight chamber in the presence of a partial vacuum, with an exposure of not less than 45 minutes.

An apparatus which will meet the above requirements has been devised and operated successfully in Washington. Briefly, the apparatus consists of a large fumigation chamber, an auxiliary chamber for the generation of the gas, and an air pump. The cotton to be fumigated is placed in a large chamber and the air exhausted until the gauge registers about 20 inches; that is, the air in the chamber is exhausted until the pressure is the equivalent of about 10 inches of mercury. At this stage the suction is cut off, the gas generated and introduced into the chamber containing the cotton. The cotton is held in this chamber for 45 minutes, and, at the expiration of that time, the gas is removed in the same manner that the air was first exhausted.

Hydrocyanic-acid gas is generated by combining potassium or sodium cyanid, sulphuric acid, and water.

By this method it is perfectly possible to penetrate to the innermost parts of the bale and destroy the larvæ of the pink boll worm. In fact, insects which are very resistant to hydrocyanic-acid gas have been killed at all points of the bale by using 3 ounces of cyanid to 100 cubic feet, with an exposure of 45 minutes.

EARLY KILLING FROSTS.

A special chart appearing in the Weekly Weather Bulletin of August 25, 1915, shows graphically for the country east of the Rocky Mountains the average date of the first killing frost in autumn. This chart is of particular interest at present because both corn and cotton in some districts have been retarded in development by continued cool and wet weather, and, unless a marked change to warmer and drier weather occurs soon, an early frost would prevent much of the late crops from maturing.

PLANT INDUSTRY REVIEWS.

(Contribution from Bureau of Plant Industry.)

Cronartium disease of pines.—An important disease of pines is for the first time fully described in a bulletin of the department series (No. 247) by George Hedgcock and William H. Long, issued on July 20. The history of the causal fungus of this disease, *Cronartium pyriforme*, is presented in detail, together with its morphology, synonymy, distribution of its aecial and other forms, and dissemination. The results of inoculation experiments, showing the effect of its several forms on host plants (pine and Comandra), are also given. One of the most serious facts in connection with the prevalence of this *Cronartium* disease in some portions of the Western States is the danger of introducing it into localities now free from it through the shipment of trees in the work of artificial reforestation. The forest nursery, if situated in mountain regions, is apt to be in a locality where Comandra plants are common. Since these serve as host plants for both the uredinal and telial forms of the causal fungus, their presence may lead directly to the infection of the young pines in the nursery and indirectly to the infection of localities hitherto free from the disease.

Fungus parasite of beets and radishes.—A fungus which stands in a causal relation to damping-off troubles of sugar-beet seedlings and the disease of radishes known as black-root is described and given the name of *Rheosporangium aphanidermatus* in a paper by H. A. Edson, published in the Journal of Agricultural Research for July 15.

Recent trials have shown that this fungus retains its virulence after a continuance of 30 months in artificial culture. The pathogenic relations of the organism were discussed in an earlier paper, but the fungus was not named or treated in its taxonomic relations.

The present paper deals with the results of such further studies involving the morphology, cytology, and taxonomy of the organism as were found necessary to establish its identity and relationships and to make clear the various stages of its life history. Five full-page illustrative plates accompany the paper.

Nasturtium wilt.—The nasturtium is subject to a bacterial disease known as wilt, which was observed for the first time in the summer of 1914. It prevents blossoming, stunts the plants, and finally kills them. The results of a study of the organism as it affects the nasturtium, made by Miss Mary K. Bryan, were published in the Journal of Agricultural Research for August 16, and have been also issued as a separate.

Cross inoculations on the tomato and tobacco produced successful and typical wilt of these plants, while inoculations on the nasturtium with a virulent strain of *Bacterium solanacearum*, isolated from tobacco, gave typical nasturtium wilt. Infection takes place from infected soil through broken roots, but stomatal infection has also been demonstrated.

Soft resins in hops.—The results of experiments to determine the extent and character of the changes of the soft resins, or so-called bitter acids, which are a principal factor in determining the commercial value of hops, are published as Department Bulletin 282, by G. A. Russell. Although sulphuring and cold storage are efficient factors in retarding the diminution of the quantity of soft resins in hops, they do not prevent chemical changes from taking place therein. The conclusion is drawn that both sulphuring and cold storage retard changes in the physical characteristics of hops. A combination of the two factors is more effective than either factor alone.

Water requirement of plants.—In breeding plants for drought resistance it is desirable to know whether the water requirement of the hybrid progeny bears a definite relationship to the water requirement of its parents. The results of studies in this subject made by L. J. Briggs and H. L. Shantz are published in the Journal of Agricultural Research for August 16.

Eight first-generation hybrids of maize and one wheat hybrid, together with their parent strains, were included in water-requirement measurements at Akron, Colo., from 1912 to 1914. On the basis of the results so far obtained the chances are even that a maize hybrid will not depart in its water requirement more than ± 6 per cent from the parental mean.

FOREST ACTIVITIES.

(Contribution from Forest Service.)

National forest receipts.—Receipts from the national forests for the fiscal year ending June 30 amounted to nearly \$2,500,000, an increase of more than \$40,000 over the previous year. Timber sales yielded \$1,164,000, a falling off from the year before of some \$79,000. Grazing receipts, on the other hand, amounted to \$1,125,000, an increase of \$127,000 over last year, while water-power receipts, totaling slightly less than \$90,000, increased nearly \$42,000.

Other sources of forest revenue which brought smaller amounts to the National Treasury were special uses, which include hotels, sawmills, and a great variety of other industries, even whaling stations, turpentine privileges, and trespass settlements. The portion of national forest

receipts which, under the law, go to the various States in which the forests are situated, will this year amount to a little more than \$600,000. Montana, Idaho, Colorado, California, Utah, Oregon, Washington, and New Mexico will receive the largest amounts. By the provisions of another act an additional sum of approximately \$240,000 from the forest receipts will be at the disposal of the Secretary of Agriculture for the construction of roads and trails, primarily for the benefit of settlers within the national forests.

Naval stores industry.—The present status of the naval stores industry and the progress which has been made in improving the methods of collecting and distilling the gum are reviewed in Department Bulletin 229, by A. W. Schorger, chemist, and H. S. Betts, engineer, of the Forest Products Laboratory. In view of the approaching exhaustion of the supply of longleaf pine in North Carolina, South Carolina, and Georgia suitable for turpentine, ways of collecting the gum which will give the maximum amount for the longest time with the least injury to the tree, and methods of distillation which will insure turpentine and rosin of the best grade, are things, say the authors, which should be made the subject of careful study by every operator.

WEATHER REVIEW NOTES.

(Contribution from the Weather Bureau.)

Effect of weather upon the yield of potatoes.—Prof. J. Warren Smith in the Monthly Weather Review for May, 1915, discusses the various conditions of the growth of the potato plant, emphasizing in particular the temperature and precipitation correlations.

The author points out that the amount of water necessary to bring the plant to maturity varies considerably with the section of the country and the character of the soil, ranging in general from 4 to 8 inches of rainfall. Among other conclusions reached are that the most important time for rainfall for potatoes, so far as these correlations show, is before blooming. "In Colorado it was found that with thorough cultivation, potatoes planted the 1st of May seldom needed irrigation until July; also that one should not irrigate after August 10, so as to give 50 to 60 days for ripening in dry earth. In Wisconsin it was found that one of the secrets of irrigation of potatoes was not to irrigate until after the young tubers had set. * * * In Utah it was found that increased irrigation increased the starch content and decreased the protein content of potatoes."

Prof. Smith shows that not only the extremes of temperatures, but also the constancy of high, low, or moderate temperatures must be considered.

CHEMISTRY NOTES.

(Contribution from Bureau of Chemistry.)

Naval stores.—A simple and accurate method for grading rosin at the still has been worked out in connection with the naval stores investigations. Durable, accurate, and practical type samples for rosin have been made of colored glass. Sets of these type samples, which have been adopted as official by all organizations having control of naval stores in this country, and also by legislative enactment by the State of Florida, have been deposited with the various trade bodies and later will be sold at cost to those desiring them.

Citrus by-products.—Improved methods of clarification, filtration, and washing in the manufacture of citrate of lime, which have been worked out by the Citrus By-Products Laboratory at Los Angeles, Cal., have resulted in obtaining a quality of citrate of lime much above the average. Citric acid of exceptional purity and fine appearance has been produced, but further work is necessary to secure a larger yield. Experiments with new devices to separate the oil from the fruit before it is crushed have already demonstrated that this method of separation will result in a higher quality of oil.

Poisonous sprays on fruits and vegetables.—What quantity of poisonous elements remain on fruits and vegetables which have been sprayed with poisonous sprays is now under investigation by the Bureau of Chemistry in cooperation with the Bureau of Plant Industry and the Bureau of Entomology. Experiments with crops sprayed will be carried on at the Arlington Farm and probably at some of the State experiment stations.

Spoilage in cereal products.—The cause of deterioration in food products, such as corn meal and flour, with special reference to the part played by microorganisms in such spoilage, is the subject of a study by the Laboratory of Microbiology. Preliminary studies have already been made with corn meal.

Flour substitutes.—So-called flour substitutes are being tested to determine what ones when used in combination with flour will make a satisfactory loaf of bread. Flour made from chestnuts, bananas, peanuts, soy beans, peas, corn, barley, oats, and rye, among a number of others, have been tried. Generally 20 to 25 per cent of a flour substitute is used with 75 to 80 per cent of a good spring wheat flour. Thirty or more of the substitutes so far experimented with can be utilized in making bread when not more than 25 parts of flour substitute is used with 75 parts of flour. Potato-flake flour is not made in this country at the present time, but it has been found that a good loaf of bread can be made by using 12 parts of boiled potato with 9 parts of ordinary flour.

STATION PUBLICATIONS.

(Contribution from States Relations Service.)

The station publications noted in this list are not distributed by the Department of Agriculture, but can usually be obtained by department workers, as far as the supply will permit, by applying to the stations issuing them. An address list of the stations will be furnished upon request by the States Relations Service. Copies of these publications can be consulted in the library of that Service and also ordinarily can be borrowed from the Department Library.

CROPPING SYSTEMS AND SOIL STUDIES.

- Alfalfa:** The King of All Fodder Plants Successfully Grown in Macon County, Alabama. By G. W. Carver. (Alabama Tuskegee Station Bulletin 29, pp. 3-7.)
- A Study of Colorado Wheat.** By W. P. Headden. (Colorado Station Bulletin 203, pt. 1, pp. 3-48.)
- The Teachings of the Kentucky Agricultural Experiment Station Relative to Soil Fertility.** By G. Roberts and J. H. Kastle. (Kentucky Station Bulletin 191, pp. 31-56.)
- Phosphates in Massachusetts Agriculture—Importance, Selection, and Use.** By W. P. Brooks. (Massachusetts Station Bulletin 162, pp. 131-167, pls. 2.)
- Losses and Preservation of Barnyard Manure.** By O. B. Winter. (Michigan Station Circular 25, pp. 2-8.)
- Hayry Vetch.** By V. M. Shoesmith. (Michigan Station Circular 27, pp. 3-8, figs. 2.)
- Crop-Growing Suggestions to Dry-Land Farmers.** By A. Atkinson. (Montana Station Circular 45, pp. 121-140, figs. 10.)
- The Potato Crop in Montana.** By O. B. Whipple. (Montana Station Circular 43, pp. 141-165, figs. 11.)
- Flax Crop Conditions for 1915.** (Montana Station Circular 48, pp. 5-8.)
- Suggestions to Alfalfa Growers.** By A. Atkinson and M. L. Wilson. (Montana Station Circular 49, pp. 9-42, figs. 31.)
- I. Probable Combinations of the Chlorine Ions in Alkali Salts. II. A Review and Discussion of Some of the Methods for the Determination of Alkali in Soils.** By R. F. Hare. (New Mexico Station Bulletin 95, pp. 3-16.)
- Use of Lime on the Farm.** By C. B. Williams. (North Carolina Station Circular 28, pp. 7.)
- Oats for North Carolina.** By C. B. Williams. (North Carolina Station Circular 30, pp. 8, figs. 2.)
- Soy Bean Growing in North Carolina.** By C. B. Williams. (North Carolina Station Circular 31, pp. 8, figs. 3.)
- Flax for Seed and Oil: Harvesting and Storing the Crop for Seed and Oil Purposes.** By H. L. Bolley. (North Dakota Station Circular 7, pp. 4.)
- Tobacco: Influence of Fertilizers on Composition and Quality.** By J. W. Ames and G. E. Boltz. Experiments with Fertilizers and Manure on Tobacco Grown Continuously and in Rotation with Wheat and Clover. By C. E. Thorne. (Ohio Station Bulletin 255, pp. 173-221, figs. 8.)
- County Experiment Farms in Ohio, Annual Reports for 1914.** By C. W. Montgomery and C. E. Thorne. (Ohio Station Bulletin 286, pp. 223-291, figs. 9.)
- The Comparative Value of Different Sources of Phosphorus.** By B. L. Hartwell and S. C. Damon. (Rhode Island Station Bulletin 163, pp. 514-560, pls. 2.)
- Losses of Moisture and Plant Food by Percolation.** By G. S. Fraps. (Texas Station Bulletin 171, pp. 3-51, fig. 1.)
- The Effect of Association of Legumes and Nonlegumes.** By W. B. Ellett et al. (Virginia Station Technical Bulletin 1, pp. 28-36, figs. 3.)
- Nitrogen Fixation and Nitrification in Various Soil Types.** By H. S. Reed and B. Williams. (Virginia Station Technical Bulletin 3, pp. 59-80.)
- The Effect of Some Organic Soil Constituents upon Nitrogen Fixation by Azotobacter.** By H. S. Reed and B. Williams. (Virginia Station Technical Bulletin 4, pp. 81-95.)
- The Effect of Green Manure on Soil Nitrates Under Greenhouse Conditions.** By H. H. Hill. (Virginia Station Technical Bulletin 6, pp. 121-153.)

ANIMAL INDUSTRY.

- Poultry House Construction.** By R. E. Jones and L. E. Card. (Connecticut Storrs Station Bulletin 81, pp. 31-55, figs. 16.)
- Third Annual International Egg Laying Contest.** By W. F. Kirkpatrick and L. E. Card. (Connecticut Storrs Station Bulletin 82, pp. 59-99, figs. 21.)

- The Silo and Its Use.** By C. H. Eckles. (Missouri College Station Bulletin 133, pp. 4-19, figs. 5.)
- Human Milk.** By A. W. Bosworth. (New York State Station Technical Bulletin 43, pp. 3-5.)
- Soy Bean Pasture for Hogs.** By D. T. Gray. (North Carolina Station Circular 24, pp. 6.)
- Feeding the Sow and the Suckling Pigs.** By D. T. Gray. (North Carolina Station Circular 25, pp. 5.)
- Pig Club Manual.** By J. D. McVean and T. E. Browne. (North Carolina Station Circular 26, pp. 31, figs. 9.)
- The Limitations of Cottonseed Meal Feeding in Poultry.** By B. F. Kaupp. (North Carolina Station Circular 27, pp. 14.)
- Feeding Skim Milk, Butter Milk, and Whey to Hogs.** By D. T. Gray. (North Carolina Station Circular 29, pp. 5.)
- Silage Feeding.** By C. I. Bray. (Oklahoma Station Circular 36, pp. 2-8.)
- The Comparative Values of Cotton Seed, Cottonseed Meal, and Corn, as Shown by Chemical Analyses.** By C. K. Francis. (Oklahoma Station Circular of Information 37, pp. 4.)

FRUITS AND VEGETABLES.

- Studies on Bean Breeding. I. Standard Types of Yellow Eye Beans.** By R. Pearl and F. M. Surface. (Maine Station Bulletin 239, pp. 161-176, pls. 6.)
- Tomato Culture in Montana.** By L. G. Schermmerhorn. (Montana Station Circular 44, pp. 111-119, figs. 5.)
- Varieties of Tree Fruits for New Jersey.** By M. A. Blake. (New Jersey Stations Circular 41, pp. 2-8.)
- The Determination of Humidity in the Greenhouse.** By M. A. Blake. (New Jersey Stations Circular 47, pp. 3-7, fig. 1.)
- The Blooming Season of Hardy Fruits.** By U. P. Hedrick. (New York State Station Bulletin 407, pp. 367-391.)
- Ripening Dates and Length of Season for Hardy Fruits.** By U. P. Hedrick. (New York State Station Bulletin 408, pp. 393-418.)
- The Pollination of the Pomaceous Fruits. II. Fruit-bud Development of the Apple.** By F. C. Bradford. (Oregon Station Bulletin 129, pp. 3-16, figs. 6.)
- Pruning: Plant Physiology as Related to Pruning.** By W. M. Atwood. The Study of Fruit Buds. By E. J. Kraus. Pruning Young Trees. By C. I. Lewis. Pruning the Bearing Apple and Pear Trees. By V. R. Gardner. Pruning the Bearing Prune Tree. By V. R. Gardner. (Oregon Station Bulletin 130, pp. 72, figs. 58.)
- Suggestions for Coffee Planting in Porto Rico.** By T. B. McClelland. (Porto Rico Federal Station Circular 15, Spanish Edition, pp. 3-23, pls. 4.)

INSECTS AND ANIMAL PARASITES.

- Dipping Vat for Hogs and Dips; Hog Worms, Lice, and Mange; Hog Lots, Houses, and Water Supply.** By C. A. Cary. (Alabama College Station Bulletin 185, pp. 37-58, fig. 1.)
- Control of the Army Cutworm.** By R. A. Cooley. (Montana Station Circular 47, pp. 3.)
- The Tree Crickets of New York: Life History and Bionomics.** By B. B. Fulton. (New York State Station Technical Bulletin 42, pp. 3-47, pls. 6, figs. 21.)
- The Arsenates of Lead.** By R. H. Robinson and H. V. Tartar. (Oregon Station Bulletin 128, pp. 3-32, figs. 3.)
- The North American Fever Tick: Notes on Life History.** By E. C. Cotton. (Tennessee Station Bulletin 113, pp. 33-77, figs. 15.)
- Insect Enemies of Sudan Grass.** By W. Newell. (Texas Station Circular 7, n. ser., pp. 3-18, figs. 6.)

PLANT DISEASES.

- Spur Blight of the Red Raspberry Caused by *Sphaerella rubina*.** By W. G. Sackett. (Colorado Station Bulletin 206, pp. 3-26, pl. 1, figs. 15.)
- Bordeaux Mixture.** By M. T. Cook. (New Jersey Stations Circular 48, pp. 3-7.)
- Notes on Plant Diseases in Virginia Observed in 1913 and 1914.** By H. S. Reed and C. H. Crabill. (Virginia Station Technical Bulletin 2, pp. 37-58, figs. 17.)
- The Cedar Rust Disease of Apples Caused by *Gymnosporangium juniperi-virginianae*.** By H. S. Reed and C. H. Crabill. (Virginia Station Technical Bulletin 9, pp. 3-106, figs. 23.)

INSPECTION AND METEOROLOGY.

- Meteorological Observations at the Massachusetts Agricultural Experiment Station.** By J. E. Ostrander and D. Potter. (Massachusetts Station Meteorological Bulletin 319, pp. 4.)
- Food and Drug Laws.** By E. F. Ladd. (North Dakota Station Special Bulletin 6 (Reprint), May, 1915, pp. 48.)
- Analyses of Commercial Fertilizers.** By P. H. Wessels et al. (Rhode Island Station Inspection Bulletin, July, 1915, pp. 2-8.)

MISCELLANEOUS.

- The County Farm Adviser.** By B. H. Crocheron. (California Station Circular 133, pp. 8, figs. 7.)
- The Colorado Statute Inch and Some Miner's Inch Measuring Devices.** By V. M. Cone. (Colorado Station Bulletin 207, pp. 3-16, figs. 5.)

SELECTED LIST OF ACCESSIONS TO DEPARTMENT LIBRARY.

August, 1915.

AGRICULTURE AND AGRICULTURAL PRODUCTS.

- Breakwell, E. Pasture grasses. 105 p. Sydney, 1915. (New South Wales. Dept. of agriculture. Farmers' bulletin no. 96) 23 N47F no. 96
- Brunning, F. H. Pty., Ltd. Lucerne manual, 1915. [32] p. Melbourne [1915] 60.3 B83
- Davis, F. W. Kafir, feterita, milo. 18 p. Austin, 1915. (Texas. Dept. of agriculture. Bulletin no. 42) 2 T312B no. 42
- Deutsche landwirtschafts-gesellschaft. Hauptprüfung der grasmäher sowie der heuwender und schwadenrechen 1914. 75 p. Berlin, 1915. (Arbeiten... hft. 273) 18 D48 no. 273
- Farm economy; a cyclopedia of agriculture. 1196 p. Minneapolis, 1915. 30.1 F22
- Frewirth, Karl. Einjährige futterpflanzen und gemenge solcher. 36 p. Berlin, 1915. (Landwirtschaftliche hefte. Herausgeber dr. L. Kiessling... hft. 27) 18 L238 no. 27
- Hale, P. H. Hale's history of agriculture by dates... Ed. 5. 95 p. St. Louis, 1915. 30.9 H13
- Hofmann, J. F. Die sicherung der getreideernte, insbesondere durch die künstliche trocknung. 40 p. Berlin, 1915. (Landwirtschaftliche hefte. Herausgeber dr. L. Kiessling... hft. 28) 18 L238 no. 28
- Holdich, Benjamin. An essay on the weeds of agriculture... Ed. by G. Sinclair... 4th ed. 82 p. London [1825] 63 H71
- Kuhnert, Robert. Der flachsbaue... 3. aufl. 34 p. Berlin, 1915. (Anleitungen für den praktischen landwirt. Hrsg. vom direktorium der Deutschen landwirtschafts-gesellschaft. Der sammlung nr. 13) 73.1 K95
- Prinsen Geerlings, H. C. Practical white sugar manufacture. 184 p. London, 1915. 65 P93P
- Robinson, E. V. D. Early economic conditions and the development of agriculture in Minnesota. 306 p. Minneapolis, 1915. (University of Minnesota. Studies in the social sciences. no. 3) 31.3 R56
- Russia—Département zemledélie. Industrie agricole en Russie. 252 p. Petrograd, 1914. 33.31 R92
- Stutzer, Albert. Futtersilos und silagefutter. 40 p. Berlin, 1915. (Landwirtschaftliche hefte. Herausgeber dr. L. Kiessling... hft. 26) 18 L238 hft. 26
- Worst, J. H. The stewardship of the soil. 23 p. Fargo, N. D., 1915. 30.4 W89

SOILS.

- Hope, G. D., and Carpenter, P. H. Suggestions for the manual treatment of tea soils. 88 p. Calcutta, 1915. (Indian tea association. [Publication. 1915, no. 2]) 68.1 In2 1915, no. 2.

IRRIGATION AND DRAINAGE.

- Missouri—Dept. of land reclamation. Missouri's swamp and overflowed lands and their reclamation. 141 p. Jefferson City, 1913. 54 M69
- Rockwell, W. L. The water resources of Texas and their utilization. By W. L. Rockwell... Irrigation of rice on the coastal prairies of Texas. By C. G. Haskell. 116 p. Austin [1915] (Texas. Dept. of agriculture. Bulletin. no. 43) 2 T312B no. 43

HORTICULTURE.

- Aheromhie, John. The garden vade mecum. 585 p. London, 1789. 90 Ab3G
- Emmerton, Isaac. A plain... treatise on the culture... of the auricula, polyanthus, carnation, pink, and the ranunculus... 2d ed. 228 p. London, 1819. 97 Em6
- Hilberd, Shirley. The ivy. 115 p. London, 1872. 97 H52I
- Hogg, Thomas. A concise and practical treatise on the... carnation, pink, auricula... and other flowers... 4th ed. 327 p. London [1823] 97 H672
- Justice, Sir James. The British gardener's new director. 4th ed. 443 p. Dublin, 1765. 90 J98
- Kindshoven, J. Schädlinge des gemüshaus und ihre bekämpfung... 4. aufl. Berlin, 1915. (Flugschriften der Deutschen landwirtschafts-gesellschaft. hft. 13) 18 D48F no. 13
- McIntosh, Charles. Flora and pomona. 2 v. in 1. London, 1829-32. 90 M18
- Paterson, Nathaniel. The manse garden. 234 p. London [1861?] 90 P27
- Paxton, Sir Joseph. A practical treatise on the cultivation of the dahlia. 109 p. London, 1838. 97 P282
- Sanders, John. The select florist. 196 p. Derby, 1829. 97 Sa53
- Sanders, T. W. Roses and their cultivation... 9th ed. 208 p. London [1913] 97 Sa5
- Taudevin, C. H. The cultivation of the perpetual flowering carnation. 23 p. Hatherley [Eng., 1912?] 97 T19
- Western Australia—Dept. of agriculture—Fruit industries commissioner. A complete work on the pruning of fruit trees. 135 p. Perth, 1912. 93 W52
- Wright, W. P. A book about sweet peas [2d] ed. 50 p. London [1912] 97 W93B

- Wright, W. P., and Castle, E. J. Pictorial practical potato growing. 151 p. London, 1913. 75 W93P
- Yeaw, F. L. Market gardening. 102 p. New York, 1915. 75 Y3

FORESTRY.

- [Hayes, Samuel] A practical treatise on planting and the management of woods and coppices. 189 p. London, 1744. 99 45 H32

DOMESTIC ANIMALS.

- American poultry association. The American standard of perfection... a complete description of all recognized varieties of fowls. 368 p. [n. p.] 1915. 47.9 Am35A
- Beuoy, George. What's a capon and why [1915 ed.] 72 p. [Kansas City, Mo., 1915] 47 B46
- Jordan, E. L. Helpful hints on hog husbandry. 98 p. Baton Rouge, La., 1915. 46 J76
- Mathews, J. W. The construction of shearing sheds and yards. 29 p. Sydney, 1915. (New South Wales. Dept. of agriculture. Farmers' bulletin no. 91) 23 N47F no. 91
- [Upton, H. E.] Poultry-house construction. 40 p. Victoria, 1915. (British Columbia. Dept. of agriculture (Live stock branch) Bulletin no. 63) 7 B77 no. 63

DAIRYING.

- Boston—Chamber of commerce—Committee on agriculture. Investigation and analysis of the production, transportation, inspection, and distribution of milk and cream in New England. 63 p. [Boston, 1915] 44 B65

SCIENCE.

- Edelman, P. E. Experiments. 256 p. Minneapolis [1914] 330 Ed2
- Pearson, Karl. The grammar of science... 3d ed. v. 1. London, 1911. 330 P31

CHEMISTRY AND PHYSICS.

- Beacall, Thomas, and others. Dyestuffs & coal-tar products. 156 p. London, 1915. 306 B35
- Congresso nazionale di chimica applicata. 2d, Turin, 1911. Atti. 544 p. Torino, 1912. 388 C762
- Gibson, A. H. Hydraulics and its applications. 757 p. New York, 1908. 334 G352
- Goltz, W. F. Some facts about treating railroad ties. pts. 4-6. Cleveland, O., 1913. 300 G58
- Hofman, M. K. Lexikon der anorganischen verbindungen... bd. 2. Leipzig, 1914. 356.1 H61
- Hughes, H. J., and Safford, A. T. A treatise on hydraulics. 505 p. New York, 1913. 334 H87
- Russell, G. E. Text-book of hydraulics. 183 p. New York, 1910. 334 R91

HOME ECONOMICS.

- [Bell, Bab] Canning of fruits and vegetables on the farm. 19 p. [Columbia, Mo.] 1915. (Missouri. State board of agriculture. Monthly bulletin. July, 1915. v. 13, no. 7) 2 M69B v. 13, no. 7
- General federation of women's clubs—Home economics dept. Suggestions for programs and club study. [51] p. [Watertown, N. Y.] 1915. 321 G28
- Taber, C. W., and Taber, M. J. Dietetic chart, no. 1-4. Chicago, 1915. 359 T11

MEDICINE.

- Citron, J. B. Immunity... tr. from the German and ed. by A. L. Garbat. 209 p. Philadelphia, 1912. 448. 2 C49

PHARMACY.

- Cushny, A. R. A textbook of pharmacology and therapeutics... 6th ed. 708 p. Philadelphia, 1915. 396 C95

NATURAL HISTORY.

- Ayres, P. W., ed. Manual of Mount Sunapee... Pub. for the Sunapee branch of the Society for protection of New Hampshire forests. 40 p. [New York, 1915] 409 Ay7
- Carpenter, W. B. The microscope and its revelations... 8th ed. 118 p. Philadelphia, 1901. 440 C22M
- Dana, J. D. The system of mineralogy... 6th ed. 1134 p. New York, 1914. 393 D19S
- Danby, Arthur. Natural rock asphalts and bitumens. 244 p. New York, 1913. 299 D19
- Smith, Sir J. E. Tracts relating to natural history. 312 p. London, 1789. 409 Sm52

BOTANY.

- Abbot, Charles. Flora Bedfordiensis. 351 p. Bedford, 1798. 458 Ab2
- Cockayne, Leonard. New Zealand plants suitable for North American gardens. 35 p. Wellington, N.Z., 1914. 460.38 C64
- Edwards-Ker, D. R. A course of practical work in the chemistry of the garden. 40 p. London, 1914. 463.2 Ed9
- Irving, Walter, and Malby, R. A. Saxifragas. 147 p. London [1915] 452.3 IrS
- Lee, James. An introduction to botany. 320 p. London, 1760. 452.04 L51
- Monti, Giuseppe. Catalogi stirpium agri Bononiensis. 120 p. Bononiae studiorum, 1719. 452.2 M76

- Murrill, W. A. Tropical polypores. 113 p. New York, 1915. 462 M96T
- Murrill, W. A. Western polypores. 36 p. New York, 1915. 462 M96W
- Stephani, Franz. Species hepaticarum. v. 5, p. 705-736. Genève, 1915. 461.32 St4
- Thiele, Rudolf. Die temperaturgrenzen der schimmelpilze in verschiedenen nährlösungen. 37 p. Leipzig, 1896. 462 T34

BIOLOGY AND ZOOLOGY.

- Berlese, Antonio. Gli insetti. v. 2, fasc. 11-12. Milano, 1913. 422 B451I
- Biologen-kalender... 1. jährg. Leipzig [1914] 442 B32
- Bronn, H. G. Klassen und ordnungen des tierreichs. bd. 4, abt. 2, lg. 145-149. Leipzig, 1915. 411 B786
- Froggatt, W. W. Sheep-maggot flies. 52 p. Sydney, 1915. (New South Wales. Dept. of agriculture. Farmers' bulletin no. 95) 23 N47F no. 95
- Gillis, S. A. Money in fox farming. 32 p. Jersey City [1915] 412 G41
- Holbrook, F. M. Skunk culture for profit. 142 p. Chicago [1915] 412 H69
- Jones, T. H. Aphides or plant-lice attacking sugarcane in Porto Rico. 19 p. [San Juan, 1915] (Porto Rico. Board of commissioners of agriculture, Rio Piedras. Bulletin no. 11) 100 P83 no. 11
- Jones, T. H. The sugar-cane moth stalk-borer (Diatraea saccharalis Fabr.). 30 p. [San Juan, 1915] (Porto Rico. Board of commissioners of agriculture, Rio Piedras. Bulletin no. 12) 100 P83 no. 12
- Jones, T. H. The sugar-cane weevil root-borer (Diaprepis spengleri L.). 19 p. San Juan, P. R., 1915. (Porto Rico. Board of commissioners of agriculture, Rio Piedras. Bulletin no. 14) 100 P83 no. 14
- Kellogg, V. L., and Parris, G. F. The Anoplura and Mallophaga of North American mammals. 74 p. Stanford University, Cal., 1915. (Leland Stanford junior university publications. University ser.) 431.3 K23A
- Kholodkovskii, N. A. Die coniferen-läuse Chermes. 44 p. Berlin, 1907. 431 C45C
- National geographic society. Common birds of town and country. Washington [1915] 413 N21
- Vermorel, Victor. Les ennemis de la betterave. 65 p. Villefranche (Rhône) 1897. 427 V59
- Vermorel, Victor, and Crolas, Ferdinand. Manuel pratique des sulfurages... 17. éd. 132 p. Villefranche (Rhône) [189-] 451.5 C87M

ECONOMICS.

- Missouri—First district normal school, Kirksville. Rural life conference number. 122 p. Kirksville, Mo., 1911. (Bulletin. v. 11, no. 2) 281.2 M69

ENGINEERING.

- American school of correspondence, Chicago. Sewers and drains... by Anson Marston. 156 p. Chicago, 1912. 293 Am3
- Murdoch, H. E. Strength of materials. 308 p. New York, 1911. 290 M34
- Preflin, Charles. Dredged and dredging... 2d ed. 279 p. New York, 1912. 290 P91D
- Stein, M. F. Water purification plants and their operation. 257 p. New York, 1915. 292 St3

BIOGRAPHY.

- Iowa park and forestry association. Major John F. Lacey. Memorial volume. 454 p. [Cedar Rapids, Iowa, 1915] 120 L112

REFERENCE BOOKS AND BIBLIOGRAPHY.

- Baker, J. T. Correct English; how to use it. 253 p. Baltimore [1907] 200 B17C
- Gates, A. J., ed. Catalogue of technical periodicals. 110 p. New York, 1915. (Library of the engineering societies. Bibliographical contributions. 1) 241.9 C22
- San Diego county free library. Books of interest to the farmers. 15 p. San Diego, Cal., 1914.
- Washington university—Library. Serial list. Inventory of serial publications in the collections of the library of Washington university... and libraries of Washington university medical school and Missouri botanical garden. 86 p. [St. Louis] 1915. 241.9 W27

ADDITIONS TO LIST OF PERIODICALS CURRENTLY RECEIVED.

- Athenaeum subject index to periodicals... List no. 1. [London] 241.11 A14
- Boletín arroceros [semi-monthly]. Valencia.
- Clemson agricultural college of South Carolina—Extension dept. Weekly news notes. Clemson College.
- Commercial west [weekly]. Minneapolis.
- Entomological magazine. Kyoto, Japan.
- The Forecaster [monthly]. New York.
- Giornale delle conserve alimentari, periodico mensile. Napoli. 359.8 G43
- Minnesota—University—Agriculture. Dept. of—Extension division. Rural school agriculture [monthly during the school year]. St. Paul, Minn.
- North Carolina—University—Bureau of extension. News letter [weekly]. Chapel Hill.
- Pennsylvania—Agriculture. Dept. of. Crop and livestock report [monthly]. Harrisburg, Pa.
- Traffic news. Chicago. 289.8 T67